Particulate Matter FAQs

What Is Particulate Matter?
Particles found in the air are called particulate matter, or PM. Particulate matter is a complex mixture of dust, dirt, soot, or smoke and liquid droplets. Some particles are large or dark enough to be seen as soot or smoke. $PM_{2.5}$ refers to particulate matter that is 2.5 micrometers in diameter or smaller (fine particles). These microscopic particles, less than one seventh the width of an average human hair, are believed to pose the greatest health risks. In contrast to ozone, $PM_{2.5}$ concentrations can be a threat to public health year-round.

Where does $PM_{2.5}$ come from?
$PM_{2.5}$ is released into the air from a variety of sources, such as cars, trucks, buses, factories, construction sites, tilled fields, unpaved roads, stone crushing and burning of wood. $PM_{2.5}$ is also formed when gases like NO_x, SO_x, and ammonia react with sunlight and water vapor. These can result from fuel combustion in motor vehicles, power plants and other industrial processes.

How does $PM_{2.5}$ affect health?
Breathing particulate matter can have numerous effects on human health. Because of their small size, fine particles can be inhaled deeply and accumulate in the respiratory system. Many health studies have linked increased exposure to $PM_{2.5}$ with increases in premature death and a range of serious respiratory and cardiovascular effects. Respiratory effects include aggravation of lung diseases, such as asthma and bronchitis, and decreased lung function. Other symptoms include coughing, chest discomfort, wheezing, and shortness of breath. Cardiovascular symptoms include chest pain, palpitations, shortness of breath, heartbeat irregularities and heart attacks.
Additionally, $PM_{2.5}$ exposure is associated with increased hospital admissions and emergency room visits for people with heart and lung diseases, and with work and school absences. Attaining the $PM_{2.5}$ standard nationally would avoid tens of thousands of premature deaths each year.

Who is most at risk from exposure to $PM_{2.5}$?
PM exposure especially affects sensitive populations, such as children, older adults and people with heart and lung diseases such as asthma and chronic obstructive pulmonary disease (COPD) (which includes chronic bronchitis and emphysema). It affects people with sensitive airways, where exposure to particle pollution can cause wheezing, coughing and respiratory irritation.

How does $PM_{2.5}$ affect the environment?
Particulate matter can also have effects on aquatic life, vegetation and animals. Fine particulate matter adversely impacts visibility because it scatters and absorbs light. It is the major source of haze, which reduces visibility in many parts of the United States including national parks like the Great Smoky Mountains. Reducing fine particle concentrations will protect public health, improve visibility and benefit the tourism industry.

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What does $PM_{2.5}$ non-attainment designation mean?
Non-attainment means an area violates the fine particle standard or that it contributes to violations of the standard in a nearby area. If a certain county is designated as non-attainment for $PM_{2.5}$, it is subject to certain restrictions on economic development and transportation projects.

How is Environment & Conservation dealing with $PM_{2.5}$?
Tennessee has a network of 24 monitors across the state taking year round $PM_{2.5}$ measurements. The most recent data from these monitors show all but two counties (Knox and Hamilton) attaining the new, stricter $PM_{2.5}$. Environment & Conservation has used this data to engage the Environmental Protection Agency (EPA) in joint consultation regarding the final designations for counties in Tennessee.

Once EPA announces its non-attainment designations, state and local governments must develop a State Implementation Plan (SIP) that details how they will reduce fine particle pollution in non-attainment areas to meet EPA's standards. States must submit their SIPs to EPA within three years after the designations become effective. SIPs require emissions offsets for new or expanding air pollution sources and conformity in new transportation projects.

Environment & Conservation takes the SIP process very seriously as EPA has the option to issue sanctions if the state does not produce or adhere to a SIP. The sanctions require even greater offsets for emissions than a SIP in addition to the withholding of funds for transportation projects.

For more background information on $PM_{2.5}$:
http://www.epa.gov/air/urbanair/pm/index.html
http://www.epa.gov/pmdesignations/
http://www.vistas-sesarm.org/

For more information on the health effects of $PM_{2.5}$:
http://lungaction.org/reports/sota04_heffects.html

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